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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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Hisashi Amaya

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07/23/2010

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EXAMINER

ROE, JESSEE RANDALL

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

07/23/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/798,855 | Applicant(s) AMAYA ET AL. | |
| | Examiner JESSEE ROE | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 May 2010 has been entered.

Status of the Claims

Claims 1-8 and 13-20 are pending wherein claims 1-8 are amended and claims 9-12 are canceled.

Status of Previous Rejections

The previous rejection of claims 1 and 3 under 35 U.S.C. 103(a) as being unpatentable over Miyata et al. (US 5,858,128) is withdrawn in view of the Applicant's amendments to claims 1 and 3. The previous rejection of claims 1-8 and 13-20 under 35 U.S.C. 103(a) as being unpatentable over Woods (US 6,716,291) in view of the ASM Metals Handbook Volume 1 is withdrawn in view of the Applicant's arguments. The previous rejection of claims 1-8 and 13-20 under 35 U.S.C. 103(a) as being unpatentable over Hara et al. (US 5,716,465) is withdrawn in view of the Applicant's arguments.

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Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8 and 13-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to the recitation “a plastically-processed history” in lines 1-2 of claims 1-8 and 13-20, the specification does not provide support for this recitation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8 and 13-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language “a plastically processed history”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (US 5,232,520).

In regards to claims 3-4, Oka et al. ('520) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table below (abstract, cols. 5-6 and Table I).

| Element | From Instant Claims (weight percent) | Oka et al. ('520) (weight percent) | Overlap |
|---------|---|---------------------------------------|--------------|
| C | 0.02 – 0.10 | 0.005 – 0.04 | 0.02 – 0.04 |
| Si | 0.05 – 1.0 | 0 – 1 | 0.05 – 1 |
| Mn | 0.05 – 0.95 | 0 – 2 | 0.05 – 0.95 |
| P | 0 – 0.03 | 0 – 0.027 | 0 – 0.027 |
| S | 0 – 0.01 | 0 – 0.004 | 0 – 0.004 |
| Cr | 9 – 15 | 12 – 17 | 12 – 15 |
| Ni | 1.0 – 4.5 | 3 – 6 | 3 – 4.5 |
| Al | 0 – 0.05 | 0 – 0.01 | 0 – 0.01 |
| N | 0 – 0.1 | 0.005 – 0.02 | 0.005 – 0.02 |
| Cu | 0.05 – 5 | 0.2 – 2 | 0.2 – 2 |
| Mo | 0.05 – 5 | 0.1 – 1.5 | 0.1 – 1.5 |
| V | 0.005 – 0.5 | 0.02 – 0.05 | 0.02 – 0.05 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum and vanadium of the martensitic stainless steel alloy disclosed by Oka et al. ('520) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. ('520) because Oka et al. ('520) discloses the same utility

(martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 3-4, the Examiner notes that Oka et al. ('520) discloses a substantially similar composition in addition to the prevention of the formation of carbides (col. 3, lines 38-44); tempering in the range of 400°C to 500°C (col. 8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 3 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 4, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. ('520) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 6 of claims 3-4, Oka et al. ('520) discloses the presence of incidental inclusions (abstract and col. 6, lines 55-60).

With respect to the “consisting of” transitional language in line 2 of claims 3-4, the Examiner notes that Oka et al. ('520) does not require elements in addition to carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, vanadium and iron. Therefore, Oka et al. ('520) meets the claims.

In regards to claims 15-16, Oka et al. ('520) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table on the following page (abstract, cols. 5-6 and Table I).

| Element | From Instant Claims (weight percent) | Oka et al. ('520) (weight percent) | Overlap |
|---------|---|---------------------------------------|--------------|
| C | 0.02 – 0.10 | 0.005 – 0.04 | 0.02 – 0.04 |
| Si | 0.05 – 1.0 | 0 – 1 | 0.05 – 1 |
| Mn | 0.05 – 0.95 | 0 – 2 | 0.05 – 0.95 |
| P | 0 – 0.03 | 0 – 0.027 | 0 – 0.027 |
| S | 0 – 0.01 | 0 – 0.004 | 0 – 0.004 |
| Cr | 9 – 15 | 12 – 17 | 12 – 15 |
| Ni | 1.0 – 4.5 | 3 – 6 | 3 – 4.5 |
| Al | 0 – 0.05 | 0 – 0.01 | 0 – 0.01 |
| N | 0 – 0.1 | 0.005 – 0.02 | 0.005 – 0.02 |
| Cu | 0.05 – 5 | 0.2 – 2 | 0.2 – 2 |
| Mo | 0.05 – 5 | 0.1 – 1.5 | 0.1 – 1.5 |
| V | 0.005 – 0.5 | 0.02 – 0.05 | 0.02 – 0.05 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum and vanadium of the martensitic stainless steel alloy disclosed by Oka et al. ('520) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions

disclosed by Oka et al. ('520) because Oka et al. ('520) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 15-16, the Examiner notes that Oka et al. ('520) discloses a substantially similar composition in addition to the prevention of the formation of carbides (col. 3, lines 38-44); tempering in the range of 400°C to 500°C (col. 8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 15 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 16, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. ('520) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 6 of claims 15-16, Oka et al.

('520) discloses the presence of incidental inclusions (abstract and col. 6, lines 55-60).

With respect to the "consisting of" transitional language in line 2 of claims 15-16, the Examiner notes that Oka et al. ('520) does not require elements in addition to carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, vanadium and iron. Therefore, Oka et al. ('520) meets the claims.

With respect to the recitation "the martensitic stainless steel having a structure resulting from one of quenching, air cooling, quenching followed by a 400°C or lower tempering treatment, or air cooling followed by a 400°C or lower tempering treatment" in claims 15-16, Oka et al. ('520) discloses tempering in the range of 400°C to 500°C (col. 8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, the same or a substantially similar structure would be expected.

With respect to the recitation "and the amounts of Cu and Mo effective to form a sulfide layer on a formed chromium oxide layer" in claims 15-16, the Examiner asserts that Oka et al. ('520) discloses amounts of copper and molybdenum effective to form this sulfide layer because Oka et al. ('520) discloses a substantially similar composition. MPEP 2112.01 I.

With respect to the recitation "the sulfide layer formed as a result of the martensitic stainless steel being subjected to a sulfur-containing environment" in claims 15-16, Oka et al. ('520) discloses a substantially similar composition. Therefore, formation of the sulfide layer would be expected when subjecting the alloy to a sulfur-

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containing environment. MPEP 2112.01 I.

In regards to claims 1-2, Oka et al. ('520) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table on the following page (abstract, cols. 5-6 and Table I).

| Element | From Instant Claims (weight percent) | Oka et al. ('520) (weight percent) | Overlap |
|---------|---|---------------------------------------|--------------|
| C | 0.02 – 0.10 | 0.005 – 0.04 | 0.02 – 0.04 |
| Si | 0.05 – 1.0 | 0 – 1 | 0.05 – 1 |
| Mn | 0.05 – 0.95 | 0 – 2 | 0.05 – 0.95 |
| P | 0 – 0.03 | 0 – 0.027 | 0 – 0.027 |
| S | 0 – 0.01 | 0 – 0.004 | 0 – 0.004 |
| Cr | 9 – 15 | 12 – 17 | 12 – 15 |
| Ni | 1.0 – 4.5 | 3 – 6 | 3 – 4.5 |
| Al | 0 – 0.05 | 0 – 0.01 | 0 – 0.01 |
| N | 0 – 0.1 | 0.005 – 0.02 | 0.005 – 0.02 |
| Cu | 0.05 – 5 | 0.2 – 2 | 0.2 – 2 |
| Mo | 0.05 – 5 | 0.1 – 1.5 | 0.1 – 1.5 |
| V | - | 0.02 – 0.05 | - |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper and molybdenum of the martensitic stainless steel alloy disclosed by Oka et al. ('520) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. ('520) because Oka et al. ('520) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the “consisting of” transitional language in line 1 of claims 1-2 and

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the vanadium content in Oka et al. ('520), the Examiner notes that Oka et al. ('520) discloses that vanadium forms carbides with carbon thus improving the strength (col. 5, lines 60-69). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit vanadium where an improvement in strength would not be required or desired. MPEP 2144.04 II. Alternatively, the Examiner notes that Oka et al. ('520) discloses that molybdenum also improves strength (col. 5, lines 53-60). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute molybdenum for vanadium within the disclosed range of 0.1 to 1.5 weight percent in order to achieve equivalent strength absent the vanadium. MPEP 2144.06.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 1-2, the Examiner notes that Oka et al. ('520) discloses a substantially similar composition in addition to the prevention of the formation of carbides (col. 3, lines 38-44); tempering in the range of 400°C to 500°C (col. 8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 1 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 2, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G.

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685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. *In re Austin, et al.*, 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. ('520) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 6 of claims 1-2, Oka et al. ('520) discloses the presence of incidental inclusions (abstract and col. 6, lines 55-60).

In regards to claims 13-14, Oka et al. ('520) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table below (abstract, cols. 5-6 and Table I).

| Element | From Instant Claims (weight percent) | Oka et al. ('520) (weight percent) | Overlap |
|---------|---|---------------------------------------|--------------|
| C | 0.02 – 0.10 | 0.005 – 0.04 | 0.02 – 0.04 |
| Si | 0.05 – 1.0 | 0 – 1 | 0.05 – 1 |
| Mn | 0.05 – 0.95 | 0 – 2 | 0.05 – 0.95 |
| P | 0 – 0.03 | 0 – 0.027 | 0 – 0.027 |
| S | 0 – 0.01 | 0 – 0.004 | 0 – 0.004 |
| Cr | 9 – 15 | 12 – 17 | 12 – 15 |
| Ni | 1.0 – 4.5 | 3 – 6 | 3 – 4.5 |
| Al | 0 – 0.05 | 0 – 0.01 | 0 – 0.01 |
| N | 0 – 0.1 | 0.005 – 0.02 | 0.005 – 0.02 |
| Cu | 0.05 – 5 | 0.2 – 2 | 0.2 – 2 |
| Mo | 0.05 – 5 | 0.1 – 1.5 | 0.1 – 1.5 |
| V | - | 0.02 – 0.05 | - |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese,

phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper and molybdenum of the martensitic stainless steel alloy disclosed by Oka et al. ('520) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. ('520) because Oka et al. ('520) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the "consisting of" transitional language in line 1 of claims 1-2 and the vanadium content in Oka et al. ('520), the Examiner notes that Oka et al. ('520) discloses that vanadium forms carbides with carbon thus improving the strength (col. 5, lines 60-69). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit vanadium where an improvement in strength would not be required or desired. MPEP 2144.04 II. Alternatively, the Examiner notes that Oka et al. ('520) discloses that molybdenum also improves strength (col. 5, lines 53-60). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute molybdenum for vanadium within the disclosed range of 0.1 to 1.5 weight percent in order to achieve equivalent strength absent the vanadium. MPEP 2144.06.

With respect to the hardness range of 30 – 45 HRC and "the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %." in claims 13-14, the Examiner notes that Oka et al. ('520) discloses a substantially similar

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composition in addition to the prevention of the formation of carbides (col. 3, lines 38-44); tempering in the range of 400°C to 500°C (col. 8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 13 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 14, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, *In re Cooper and Foley* 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, *Saklatwalla v. Marburg*, 620 O.G. 685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. *In re Austin, et al.*, 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. ('520) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 6 of claims 13-14, Oka et al. ('520) discloses the presence of incidental inclusions (abstract and col. 6, lines 55-60).

With respect to the recitation “the martensitic stainless steel having a structure resulting from one of quenching, air cooling, quenching followed by a 400°C or lower tempering treatment, or air cooling followed by a 400°C or lower tempering treatment” in claims 13-14, Oka et al. ('520) discloses tempering in the range of 400°C to 500°C (col.

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8, lines 34-48); and hot rolling at 1250°C followed by quenching (col. 7, lines 16-25 and col. 8, lines 1-8). Therefore, the same or a substantially similar structure would be expected.

With respect to the recitation “and the amounts of Cu and Mo effective to form a sulfide layer on a formed chromium oxide layer” in claims 13-14, the Examiner asserts that Oka et al. ('520) discloses amounts of copper and molybdenum effective to form this sulfide layer because Oka et al. ('520) discloses a substantially similar composition. MPEP 2112.01 I.

With respect to the recitation “the sulfide layer formed as a result of the martensitic stainless steel being subjected to a sulfur-containing environment” in claims 13-14, Oka et al. ('520) discloses a substantially similar composition. Therefore, formation of the sulfide layer would be expected when subjecting the alloy to a sulfur-containing environment. MPEP 2112.01 I.

Claims 5-8 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (JP 11-310823).

In regards to claims 7-8, Oka et al. (JP '823) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table on the following page (abstract and [0005]).

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| Element | From Instant Claims (weight percent) | Oka et al. (JP '823) (weight percent) | Overlap |
|---------|---|--|---------------|
| C | 0.02 – 0.10 | 0.10 – 0.18 | 0.10 |
| Si | 0.05 – 1.0 | 0 – 0.5 | 0.05 – 0.5 |
| Mn | 0.05 – 0.95 | 0.1 – 1.5 | 0.1 – 0.95 |
| P | 0 – 0.03 | 0 – 0.02 | 0 – 0.02 |
| S | 0 – 0.01 | 0 – 0.01 | 0 – 0.01 |
| Cr | 9 – 15 | 12 – 14 | 12 – 14 |
| Ni | 1.0 – 4.5 | 1 – 3 | 1 – 3 |
| Al | 0 – 0.05 | 0 – 0.30 | 0 – 0.05 |
| N | 0 – 0.1 | 0.001 – 0.08 | 0.001 – 0.08 |
| Cu | 0.05 – 5 | 0 – 1.5 | 0.05 – 1.5 |
| Mo | 0.05 – 5 | 0 – 0.5 | 0.05 – 0.5 |
| Ti | 0.005 – 0.5 | 0.001 – 0.05 | 0.005 – 0.05 |
| Ca | 0.0003 – 0.005 | 0.001 – 0.01 | 0.001 – 0.005 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, titanium and calcium of the martensitic stainless steel alloy disclosed by Oka et al. (JP '823) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. (JP '823) because Oka et al. (JP '823) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 7-8, the Examiner notes that Oka et al. (JP '823) discloses a substantially similar composition in addition to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1

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point. Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected due to a substantially similar composition and process. MPEP 2112.01 I.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 7 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 8, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. (JP ‘823) such that the formula would be satisfied because Oka et al. (JP ‘823) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 7 of claims 7-8, Oka et al. (JP ‘823) discloses the presence of impurities (abstract).

In regards to claims 19-20, Oka et al. (JP ‘823) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table on the following page (abstract and [0005]).

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| Element | From Instant Claims (weight percent) | Oka et al. (JP '823) (weight percent) | Overlap |
|---------|---|--|---------------|
| C | 0.02 – 0.10 | 0.10 – 0.18 | 0.10 |
| Si | 0.05 – 1.0 | 0 – 0.5 | 0.05 – 0.5 |
| Mn | 0.05 – 0.95 | 0.1 – 1.5 | 0.1 – 0.95 |
| P | 0 – 0.03 | 0 – 0.02 | 0 – 0.02 |
| S | 0 – 0.01 | 0 – 0.01 | 0 – 0.01 |
| Cr | 9 – 15 | 12 – 14 | 12 – 14 |
| Ni | 1.0 – 4.5 | 1 – 3 | 1 – 3 |
| Al | 0 – 0.05 | 0 – 0.30 | 0 – 0.05 |
| N | 0 – 0.1 | 0.001 – 0.08 | 0.001 – 0.08 |
| Cu | 0.05 – 5 | 0 – 1.5 | 0.05 – 1.5 |
| Mo | 0.05 – 5 | 0 – 0.5 | 0.05 – 0.5 |
| Ti | 0.005 – 0.5 | 0.001 – 0.05 | 0.005 – 0.05 |
| Ca | 0.0003 – 0.005 | 0.001 – 0.01 | 0.001 – 0.005 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, titanium and calcium of the martensitic stainless steel alloy disclosed by Oka et al. (JP '823) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. (JP '823) because Oka et al. (JP '823) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 19-20, the Examiner notes that Oka et al. (JP '823) discloses a substantially similar composition in addition to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1

point. Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected due to a substantially similar composition and process. MPEP 2112.01 I.

With respect to the formula $0.2\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 19 and $0.55\% \leq \text{Mo} + \text{Cu}/4 \leq 5\%$ in claim 20, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. (JP '823) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 7 of claims 19-20, Oka et al. (JP '823) discloses the presence of presence of impurities (abstract).

With respect to the recitation “the martensitic stainless steel having a structure resulting from one of quenching, air cooling, quenching followed by a 400°C or lower tempering treatment, or air cooling followed by a 400°C or lower tempering treatment” in claims 19-20 et al. (JP '823) discloses to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1 point.. Therefore, the same or a substantially similar structure would be

expected.

With respect to the recitation “and the amounts of Cu and Mo effective to form a sulfide layer on a formed chromium oxide layer” in claims 19-20, the Examiner asserts that Oka et al. (JP ‘823) discloses amounts of copper and molybdenum effective to form this sulfide layer because Oka et al. (JP ‘823) discloses a substantially similar composition. MPEP 2112.01 I.

With respect to the recitation “the sulfide layer formed as a result of the martensitic stainless steel being subjected to a sulfur-containing environment” in claims 19-20, Oka et al. (JP ‘823) discloses a substantially similar composition. Therefore, formation of the sulfide layer would be expected when subjecting the alloy to a sulfur-containing environment. MPEP 2112.01 I.

In regards to claims 5-6, Oka et al. (JP ‘823) discloses a martensitic stainless steel having a composition relative to that of the instant invention as shown in the table below (abstract and [0005]).

| Element | From Instant Claims (weight percent) | Oka et al. (JP ‘823) (weight percent) | Overlap |
|----------------|---|--|----------------|
| C | 0.02 – 0.10 | 0.10 – 0.18 | 0.10 |
| Si | 0.05 – 1.0 | 0 – 0.5 | 0.05 – 0.5 |
| Mn | 0.05 – 0.95 | 0.1 – 1.5 | 0.1 – 0.95 |
| P | 0 – 0.03 | 0 – 0.02 | 0 – 0.02 |
| S | 0 – 0.01 | 0 – 0.01 | 0 – 0.01 |
| Cr | 9 – 15 | 12 – 14 | 12 – 14 |
| Ni | 1.0 – 4.5 | 1 – 3 | 1 – 3 |
| Al | 0 – 0.05 | 0 – 0.30 | 0 – 0.05 |
| N | 0 – 0.1 | 0.001 – 0.08 | 0.001 – 0.08 |
| Cu | 0.05 – 5 | 0 – 1.5 | 0.05 – 1.5 |
| Mo | 0.05 – 5 | 0 – 0.5 | 0.05 – 0.5 |

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| | | | |
|----|----------------|--------------|---------------|
| Ti | - | 0.001 – 0.05 | - |
| Ca | 0.0003 – 0.005 | 0.001 – 0.01 | 0.001 – 0.005 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, and calcium of the martensitic stainless steel alloy disclosed by Oka et al. (JP '823) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. (JP '823) because Oka et al. (JP '823) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the “consisting of” transitional language in line 1 of claims 5-6 and the titanium content in Oka et al. (JP '823), the Examiner notes that Oka et al. (JP '823) discloses that titanium prevents hot working degradation due to sulfur [0020]. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit titanium where prevention of degradation due to sulfur would not be required or desired. MPEP 2144.04 II. Alternatively, the Examiner notes that Oka et al. (JP '823) discloses that calcium also prevents hot working degradation due to sulfur [0021]. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute calcium for titanium within the disclosed range of 0.001 to 0.01 weight percent in order to achieve equivalent prevention of degradation due to sulfur absent the titanium. MPEP 2144.06.

With respect to the hardness range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %.” in claims 5-6, the Examiner notes that Oka et al. (JP ‘823) discloses a substantially similar composition in addition to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1 point. Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected due to a substantially similar composition and process. MPEP 2112.01 I.

With respect to the formula $0.2\% \leq Mo + Cu/4 \leq 5\%$ in claim 5 and $0.55\% \leq Mo + Cu/4 \leq 5\%$ in claim 6, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. (JP ‘823) such that the formula would be satisfied because Oka et al. (JP ‘823) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 7 of claim 7 and line 6 of claim 8, Oka et al. (JP ‘823) discloses the presence of impurities (abstract).

In regards to claims 17-18, Oka et al. (JP ‘823) discloses a martensitic stainless

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steel having a composition relative to that of the instant invention as shown in the table below (abstract and [0005]).

| Element | From Instant Claims (weight percent) | Oka et al. (JP '823) (weight percent) | Overlap |
|---------|---|--|---------------|
| C | 0.02 – 0.10 | 0.10 – 0.18 | 0.10 |
| Si | 0.05 – 1.0 | 0 – 0.5 | 0.05 – 0.5 |
| Mn | 0.05 – 0.95 | 0.1 – 1.5 | 0.1 – 0.95 |
| P | 0 – 0.03 | 0 – 0.02 | 0 – 0.02 |
| S | 0 – 0.01 | 0 – 0.01 | 0 – 0.01 |
| Cr | 9 – 15 | 12 – 14 | 12 – 14 |
| Ni | 1.0 – 4.5 | 1 – 3 | 1 – 3 |
| Al | 0 – 0.05 | 0 – 0.30 | 0 – 0.05 |
| N | 0 – 0.1 | 0.001 – 0.08 | 0.001 – 0.08 |
| Cu | 0.05 – 5 | 0 – 1.5 | 0.05 – 1.5 |
| Mo | 0.05 – 5 | 0 – 0.5 | 0.05 – 0.5 |
| Ti | - | 0.001 – 0.05 | - |
| Ca | 0.0003 – 0.005 | 0.001 – 0.01 | 0.001 – 0.005 |
| Fe | Balance | Balance | Balance |

The Examiner notes that the amounts of carbon, silicon, manganese, phosphorus, sulfur, chromium, nickel, aluminum, nitrogen, copper, molybdenum, and calcium of the martensitic stainless steel alloy disclosed by Oka et al. (JP '823) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions from the compositions disclosed by Oka et al. (JP '823) because Oka et al. (JP '823) discloses the same utility (martensitic stainless steel alloy) throughout the disclosed ranges.

With respect to the hardness range of 30 – 45 HRC and "the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume %." in claims 17-

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18, the Examiner notes that Oka et al. (JP '823) discloses a substantially similar composition in addition to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1 point. Therefore, a hardness in the range of 30 – 45 HRC and “the amount of carbides in grain boundaries of the prior austenite is not more than 0.13 volume % would be expected due to a substantially similar composition and process. MPEP 2112.01 I.

With respect to the formula $0.2\% \leq Mo + Cu/4 \leq 5\%$ in claim 17 and $0.55\% \leq Mo + Cu/4 \leq 5\%$ in claim 18, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Saklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. In re Austin, et al., 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts of copper and molybdenum from the ranges disclosed by Oka et al. ('520) such that the formula would be satisfied because Oka et al. (JP '823) discloses the same utility throughout the disclosed ranges.

With respect to the presence of impurities in line 6 of claims 17-18, Oka et al. (JP '823) discloses the presence of presence of impurities (abstract).

With respect to the “consisting of” transitional language in line 2 of claims 17-18 and the titanium content in Oka et al. (JP '823), the Examiner notes that Oka et al. (JP '823) discloses that titanium prevents hot working degradation due to sulfur [0020].

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Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit titanium where prevention of degradation due to sulfur would not be required or desired. MPEP 2144.04 II. Alternatively, the Examiner notes that Oka et al. (JP '823) discloses that calcium also prevents hot working degradation due to sulfur [0021]. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute calcium for titanium within the disclosed range of 0.001 to 0.01 weight percent in order to achieve equivalent prevention of degradation due to sulfur absent the titanium. MPEP 2144.06.

With respect to the recitation "the martensitic stainless steel having a structure resulting from one of quenching, air cooling, quenching followed by a 400°C or lower tempering treatment, or air cooling followed by a 400°C or lower tempering treatment" in claims 17-18 et al. (JP '823) discloses to hot rolling at the Ac_3 , followed by cooling at a rate at least equal to air velocity, followed by tempering at a temperature not higher than the Ac_1 point.. Therefore, the same or a substantially similar structure would be expected.

With respect to the recitation "and the amounts of Cu and Mo effective to form a sulfide layer on a formed chromium oxide layer" in claims 17-18, the Examiner asserts that Oka et al. (JP '823) discloses amounts of copper and molybdenum effective to form this sulfide layer because Oka et al. (JP '823) discloses a substantially similar composition. MPEP 2112.01 I.

With respect to the recitation "the sulfide layer formed as a result of the martensitic stainless steel being subjected to a sulfur-containing environment" in claims

17-18, Oka et al. (JP '823) discloses a substantially similar composition. Therefore, formation of the sulfide layer would be expected when subjecting the alloy to a sulfur-containing environment. MPEP 2112.01 I.

Response to Arguments

Applicant's arguments with respect to claims 1-8 and 13-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Jessee Roe/
Examiner, Art Unit 1793